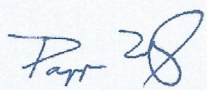


23rd January, 2017

To who it may concern,

This document is to certify that the abstract entitled: "COMPARISON OF SPECKLE-TRACKING ECHOCARDIOGRAPHY WITH INVASIVE HEMODYNAMICS FOR THE DETECTION OF CHARACTERISTIC CARDIAC DYSFUNCTION IN TYPE-1 AND TYPE-2 DIABETIC RAT MODELS" submitted by Bálint András Barta as a first author has been accepted as a poster presentation at the **CARDIOVASCULAR RESEARCH DAYS 2018** congress, to be held in **Debrecen, Hungary, 1 – 3 March 2018**.

Sincerely,



Zoltán Papp
Meeting Organizing Chairman



Comparison of speckle-tracking echocardiography with invasive hemodynamics for the detection of characteristic cardiac dysfunction in type-1 and type-2 diabetic rats.

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Purpose

Diabetic cardiomyopathy is a consequence of direct metabolic effects of diabetes mellitus (DM). Comparison of animal models of type 1 (T1DM) and type 2 DM (T2DM) may contribute to a deeper pathophysiologic understanding of diabetic cardiomyopathy.

We aimed to comparatively investigate diabetic cardiomyopathy by left ventricular (LV) pressure-volume (P-V) analysis and by the non-invasive speckle-tracking echocardiography (STE) in rat models of T1DM and T2DM.

Methods

Rat models

Type-1 DM

Young male Sprague-Dawley (SD) rats received streptozotocin (60 mg/kg BW) intraperitoneally. Control rats received only vehicle (SDC).

Experiments were performed after 8 week diabetes duration (SDDiab).

Type-2 DM

Zucker Diabetic Fatty rats (ZDF).

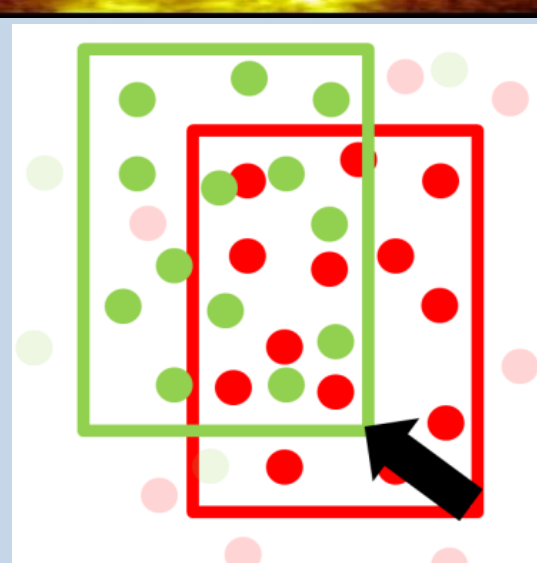
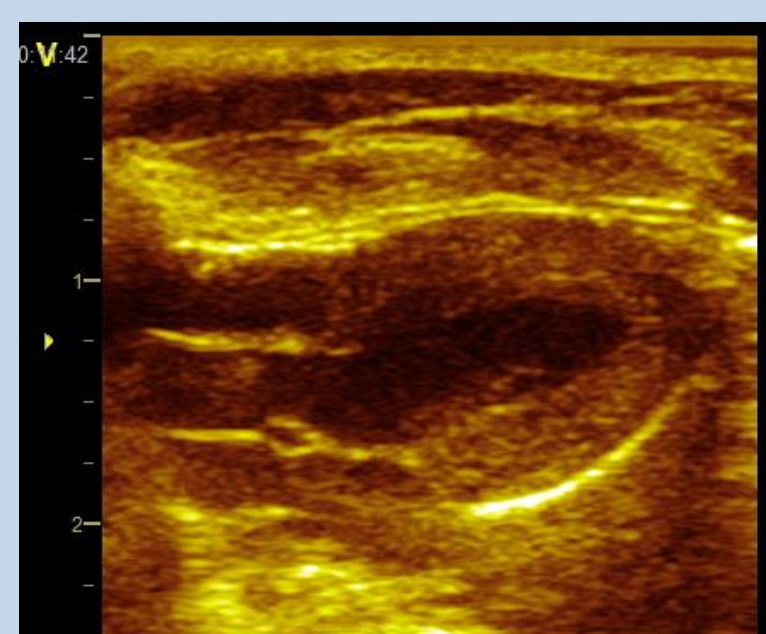
ZDF-lean rats served as control group (ZDFLean).

Experiments were performed 30-32 weeks of age.

Methods

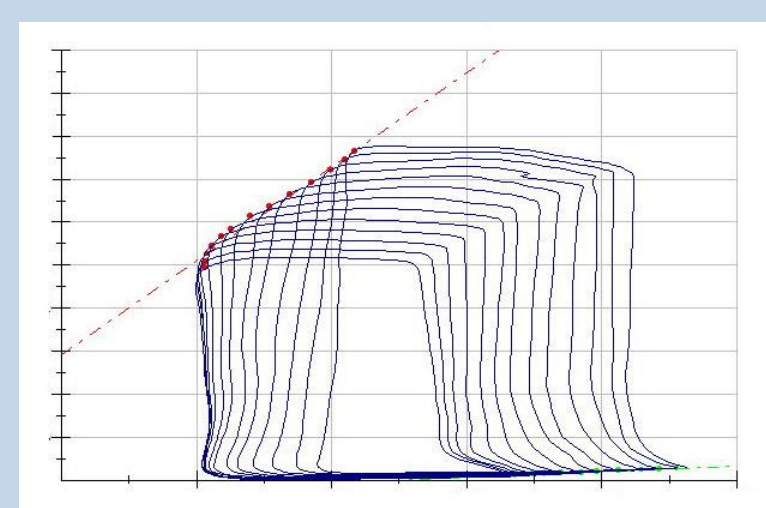
Echocardiography:

- 13 MHz linear transducer
- conventional analysis
- LV morphology and function
- speckle-tracking analysis
- strain and strain rate parameters



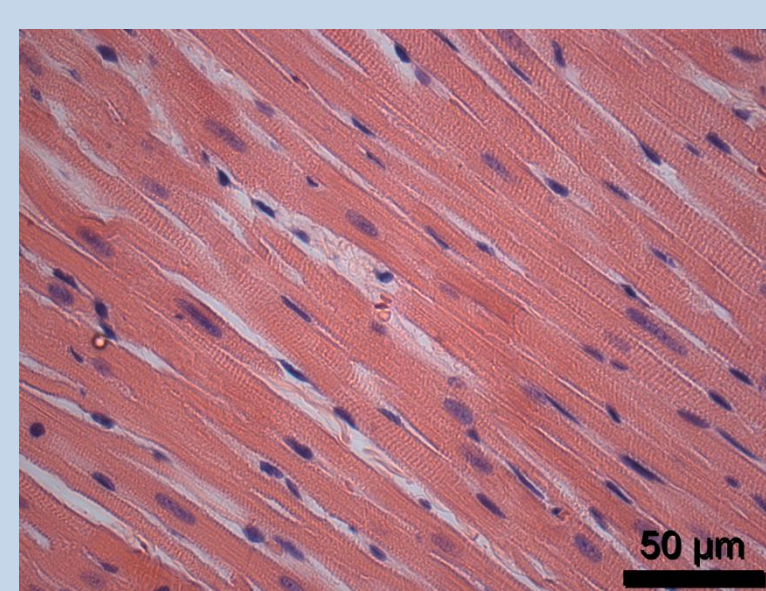
LV pressure-volume analysis:

- Millar 2 Fr pressure-conductance microcatheter
- baseline hemodynamics
- sensitive contractility indices
- diastolic parameters



Histology:

- LV myocardium
- HE staining (cardiomyocyte hypertrophy)
- Masson's trichrome staining (fibrosis)



Statistics:

- Unpaired Student's t-test
- Mann-Whitney U test
- Pearson or Spearman correlation

Conclusions

Diabetic cardiomyopathy is characterized by overt systolic dysfunction and impaired active relaxation in T1DM, while with increased LV stiffness in T2DM. STE corresponds to P-V analysis by unveiling key differences between cardiac dysfunction caused by T1DM and T2DM.

Results

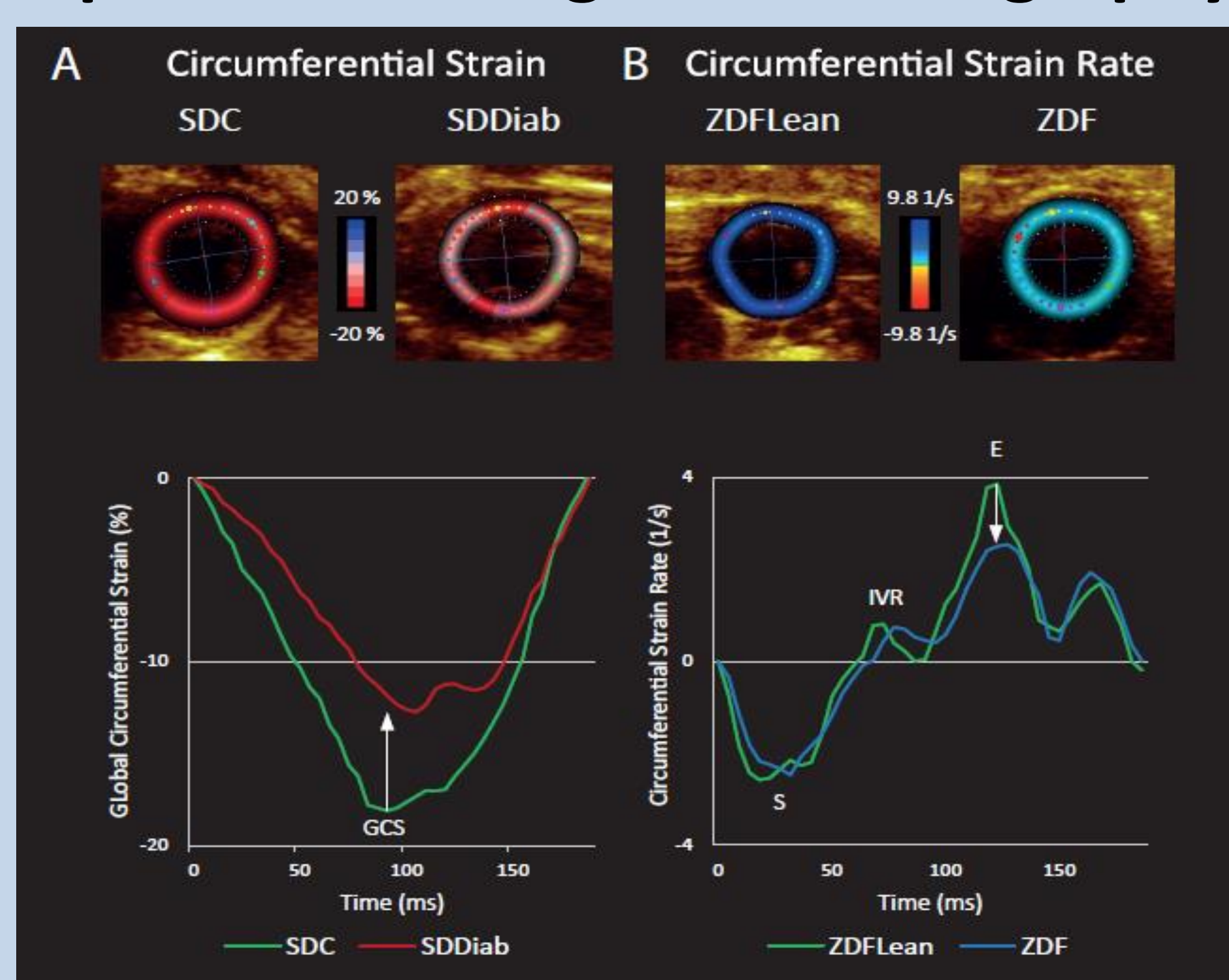
E-mail contact: barta.balint@gmail.com

Basic characteristics and conventional echocardiography

Variable	SDC	SDDiab	ZDFLean	ZDF
BW (g)	529±13	288±23*	415±9	394±17
HW (g)	1.50±0.05	1.16±0.09*	1.45±0.02	1.48±0.06
HW/BW (kg/g)	2.8±0.1	4.0±0.1*	3.5±0.1	3.8±0.2
HW/TL (g/cm)	0.32±0.01	0.28±0.02	0.35±0.01	0.37±0.01*
Blood glucose (mM)	7.6±0.4	33.1±0.2*	9.8±0.6	27.0±0.6*
MAP (mmHg)	153±5	127±4*	98±3	100±2
HR (1/min)	364±21	250±10*	300±6	292±6
FS (%)	51±3	43±2*	40±2	42±2
LVAWs (mm)	3.3±0.9	2.5±0.9*	2.5±0.9	2.8±0.9
LVAWd (mm)	2.2±0.9	1.5±0.9*	1.7±0.9	1.9±0.9*
LVIDs (mm)	3.0±0.9	3.9±1.0*	4.8±1.0	4.7±1.0
LVIDd (mm)	6.1±1.0	6.9±0.9*	8.1±1.0	8.1±1.0
LVPWs (mm)	3.5±1.0	2.6±0.9*	2.7±0.9	3.2±0.9*
LVPWd (mm)	2.4±0.9	1.7±0.9*	1.7±0.9	2.2±0.9*

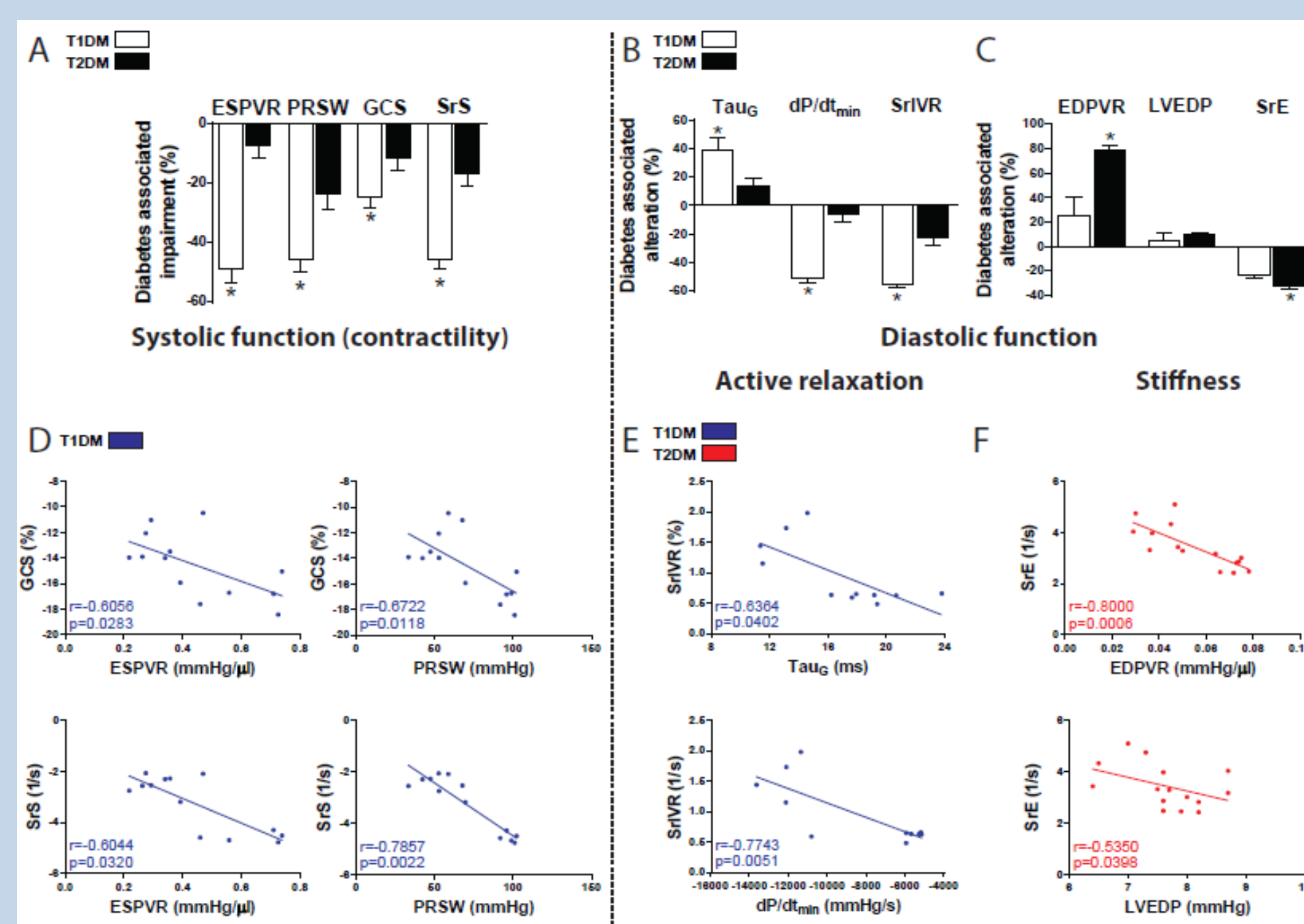
*p<0.05 vs. corresponding controls

Speckle-tracking echocardiography



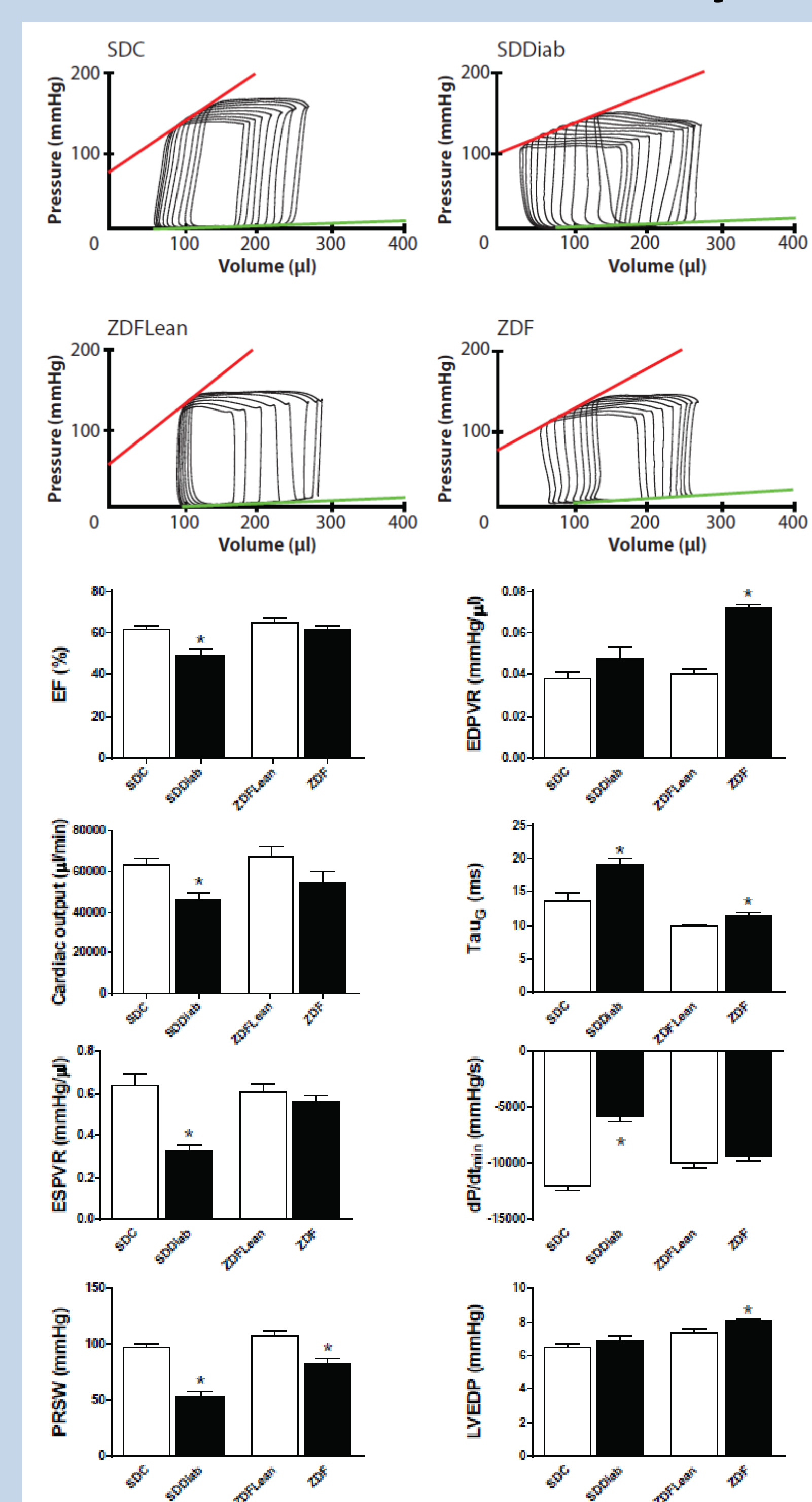
*p<0.05 vs. corresponding controls

Diabetes-associated impairment of systolic and diastolic function

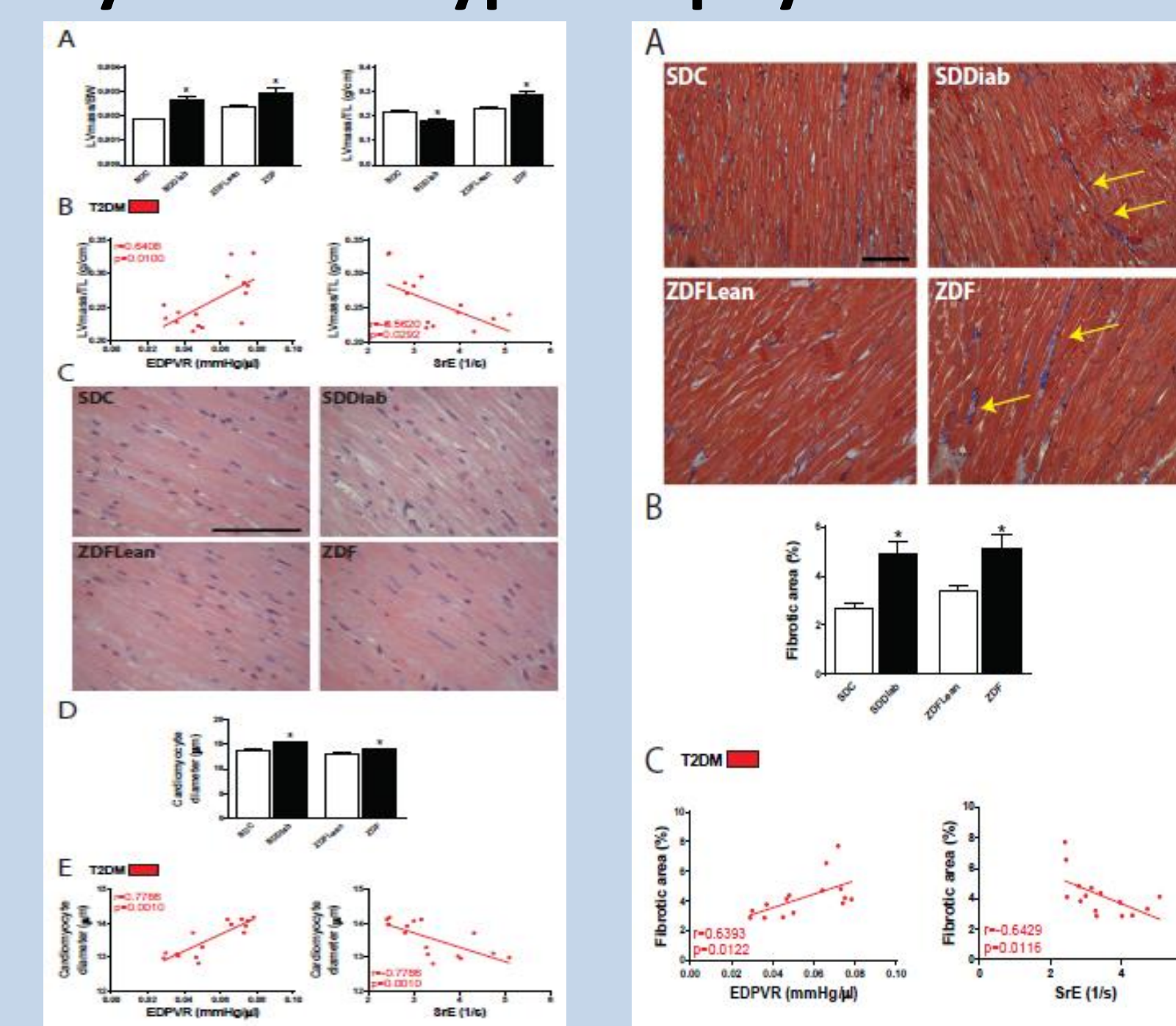


*p<0.05 T1DM vs. T2DM

Left ventricular P-V analysis



LV stiffness correlates with myocardial hypertrophy and fibrosis



*p<0.05 vs. corresponding controls